ORGANIC CHEMISTRY

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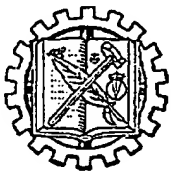

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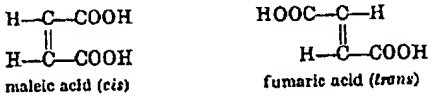
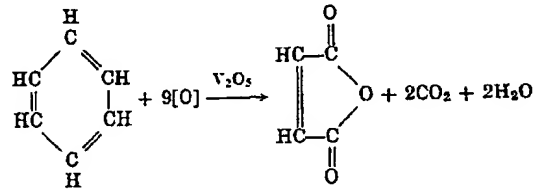
The Dieckmann condensation of diethyladipate gives a cyclopentanone derivative (Section 41.3c).

41.8 UNSATURATED ALIPHATIC DIBASIC ACIDS

a. **Maleic acid and fumaric acid.** These acids are geometric isomers of 1,2-ethenedicarboxylic acid.



Maleic anhydride is prepared by passing benzene vapor and air over vanadium pentoxide at 400–500°.



The anhydride may be hydrolyzed to maleic acid by heating it with water Maleic acid melts at 130–130.5°; at 160° and above it is converted to th anhydride. Maleic acid is a stronger acid than fumaric acid and is quit soluble in water.

Fumaric acid occurs free in many plants. It does not melt, at atmospheri pressure, but sublimes at about 200°. Fumaric acid is difficultly solubl in water and is somewhat more stable than the *cis* form. It does not forr a corresponding cyclic anhydride because the carboxyl groups are too fa apart. At temperatures of 250–300°, fumaric acid undergoes isomerizatio and loss of water to form maleic anhydride.

When a concentrated solution of maleic acid in hydrochloric acid : heated, isomerization takes place and the less soluble fumaric aci separates. In this isomerization, the double bond must become a sing bond temporarily so that rotation may occur.